

Facial Mask-related Acne and Acneiform Eruption During the Coronavirus Disease 2019 Pandemic: A Case Series

by SUBUHI KAUL, MD; ISHMEET KAUR, MD; and DEEPAK JAKHAR, MD

Dr. Kaul is with the Department of Internal Medicine, John H. Stroger Hospital of Cook County in Chicago, Illinois. Drs. Kaur and Jakhar are with the Department of Dermatology, North Delhi Municipal Corporation Medical College and Hindu Rao Hospital in New Delhi, India.

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ABSTRACT

Use of a facial mask is a necessity during the current pandemic. The associated occlusion with extended daily use can lead to physiological changes in the skin with resultant irritation, itching, and infections. This can lead to exacerbation of pre-existing dermatoses or induction of irritant dermatitis or bacterial folliculitis. We observed several patients with previously controlled acne vulgaris who developed a flare. Also, in those without a history of pre-existing acne, an acneiform eruption was noted. The majority of patients were women who had pre-existing acne and needed to wear a N95 respirator or a surgical mask for several hours a day, every day. A few suggested simple preventative measures provided herein might help this vulnerable population.

KEY WORDS: N95, face, mask, acne, acneiform eruption, rash, COVID-19, maskne

Several countries have guidelines and policies mandating facial mask use in public places as part of the effort to contain the spread of severe acute respiratory syndrome coronavirus 2, responsible for coronavirus disease 2019 (COVID-19). For occupations that require employees to be physically present at the workplace, such as, in the healthcare or service industries, this entails several hours of facial mask use every day. This extended mask wear can lead to prolonged cutaneous occlusion and contact with sensitizing chemicals. As a result, several dermatoses have been observed with facial mask use, including, irritant contact dermatitis, allergic contact dermatitis, flare of rosacea, and contact urticaria.¹ A previous study found that skin adverse effects, including itching, rash, and acne, were common with N95 respirator use but not with surgical mask use.² The present observational study describes cases with acne or acneiform eruption related to the use of both surgical face masks and N95 respirators.

CASE REPORT

We report 10 cases of mask-related acne and acneiform exacerbation observed in two tertiary care centers located in New Delhi, India, and Chicago, Illinois, United States, respectively. The mean age of the patients was

26.3 years, and all were female except for one. Four of these patients (40%) were healthcare workers and wore surgical (polypropylene) masks for more than eight hours per day with intermittent N95 respirator use. One of these healthcare workers also used plastic goggles for eye protection and developed erythematous papules predominantly on the nasal bridge. Other patients were in different service settings and had to use face masks for more than six hours every day. Out of the 10 included patients, six had a previous history of acne vulgaris, which was well controlled prior to mask use. In the patients with pre-existing acne, new-onset pustules and inflammatory papules predominantly in the area covered by the mask were noticed. Four patients had no past history of acne vulgaris before wearing a face mask. In those patients, the area covered by a mask developed erythema and multiple pustules. None of the patients had a history of rosacea in the past. All patients complained of itching and irritation in the mask area, while a burning sensation was reported by four patients. Three patients had history of atopy, which was well controlled. All patients worked in an ambient temperature of 22°C to 24°C during office hours. The most commonly affected areas were the cheeks and chin, followed by the nose. The average time to

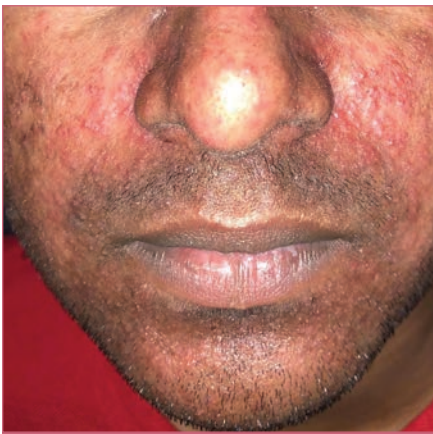
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CORRESPONDENCE: Deepak Jakhar, MD; Email: dr.deepakjakhar@yahoo.in

TABLE 1. Characteristics of patients with facial mask related acne or acneiform eruption

PATIENT NUMBER	AGE (IN YEARS)/SEX	DERMATOSIS	AREA AFFECTED	MASK USED PREDOMINANTLY	TIME TO ONSET	PRE-EXISTING DIAGNOSIS OF ACNE VULGARIS
Patient 1	35/female	Acne exacerbation in mask area	Cheeks and chin	Surgical mask	3 weeks	Yes
Patient 2	28/female	Acne exacerbation in mask area	Cheeks	Surgical mask	2 weeks	Yes
Patient 3	40/female	Acneiform eruption	Cheeks	Surgical mask and N95 respirator	2 weeks	No
Patient 4	29/female	Acne exacerbation in mask area and area occluded by goggles	Chin and nose	Surgical mask	8 weeks	Yes
Patient 5	18/female	Acne exacerbation in mask area	Cheeks	Surgical mask	3 weeks	Yes
Patient 6	29/male	Acneiform eruption	Cheeks, chin and nose	N95 respirator and surgical mask	3 weeks	No
Patient 7	28/female	Acneiform eruptions	Cheeks	N95 respirator and surgical mask	2 weeks	No
Patient 8	19/female	Acne exacerbation in mask area	Cheeks and chin	N95 respirator and surgical mask	2 weeks	Yes
Patient 9	22/female	Acneiform eruptions	Cheeks	Surgical mask	5 weeks	No
Patient 10	23/female	Acne exacerbation in the mask area	Cheeks and chin	Surgical mask	4 weeks	Yes

**FIGURE 1.** Mask related acneiform eruption with multiple pustules present on an erythematous background on the nose and cheek in a male patient**FIGURE 2.** Mask related flare of acne vulgaris, with multiple inflammatory papules and pustules on the nose, cheek and chin**FIGURE 3.** Exacerbation of pre-existing acne in a young female patient

onset of the flare was about 3.4 weeks (range, 2–8 weeks) after daily mask use. None of these patients used any topical or systemic medications with the potential to induce or flare up acne or cause acneiform eruptions. One patient opted to wear a cotton mask with the surgical mask over it, with a resultant decrease in irritation. The clinical and mask-related characteristics of the patients are summarized in Table 1.

Mask-related acne and acne-like eruptions have been referred to as “maskne” in the news and on social media.³ Patient education materials, including self-care tips for the prevention and amelioration of facial mask-related skin problems, have been made available online by the American Association of Dermatology.⁴ Although, Foo et al⁵ found acne to be the most common adverse effect of face mask use, other authors did not find it

to be common.⁶ This discrepancy might be due to a decreased presentation to dermatologists given the restrictions on clinic visits brought on by COVID-19 and prolonged wait times for dermatology appointments. We observed flares of acne and the development of erythema and acneiform eruptions in several patients. This observation was made regardless of geographic location and associated differences in climates, highlighting the role of occlusion in the pathogenesis of maskne. However, our observation was limited by the lack of a control group and the absence of histopathological confirmation of diagnoses.

Possible mechanisms of maskne include follicular plugging from trapped oils and altered skin flora subsequent to prolonged cutaneous occlusion. Theoretically, these changes can lead to increased inflammation; however, the exact mechanism of acne exacerbation or

acneiform eruption is uncertain. Additionally, occlusion can lead to deleterious changes in the skin barrier, which can explain the increased cutaneous irritation accompanying mask wear. The commonly described changes are an increase in passive transepidermal water loss (TEWL), a change in skin flora composition, increased bacterial counts, and increased pH, all of which can lead to compromised barrier function.^{7,8} These changes can increase the predilection for contact irritant dermatitis, infections such as bacterial folliculitis, or a flare of pre-existing dermatoses like atopic or seborrheic dermatitis.⁹ Occlusion can also potentiate the irritative potential of any topical products.⁸

The physiological effects of donning medical masks and N95 respirators among patients without pre-existing skin conditions were evaluated by Hua et al,⁶ who found that,

with both N95 respirator and surgical masks, TEWL, erythema, skin pH, skin hydration, and sebum production were increased in the area covered, and these changes persisted even after mask removal in the case of N95 respirators.⁶ Furthermore, a survey found that about 50 percent of patients who used facial masks experienced pruritus and erythema, with longer times of face mask or goggle use associated with two times higher odds of skin damage.¹⁰

Suggested general preventive measures include 1) daily changing of masks, in the case of surgical masks; 2) washing the mask after every use, in the case of cloth masks; 3) avoidance of occlusive substances like oil- or petrolatum-based emollients or cosmetic products; 4) use of a mild non-soap-based cleanser for the cleaning face; and 5) regular break times with removal of masks for 15 minutes every four hours in a socially distant space, such as outdoors or in one's own car.⁴ Specific therapeutic modalities include the use of a mild retinoid at night (short contact period), either daily or on alternate nights as tolerated, especially in those with pre-existing acne. Although retinoids can help prevent acne flares and might be preferred over benzoyl peroxide for this reason, they can also cause significant irritant dermatitis. This adverse effect is particularly pronounced

when combined with the occlusive effect of a mask; therefore, care should be taken to avoid prolonged contact times and combination with other irritants such as salicylic acid or benzoyl peroxide, and the use of a noncomedogenic emollient prior to mask use should be encouraged. The use of oral antibiotics, topical antibiotics, and oral isotretinoin can be decided on a case-by-case basis.

CONCLUSION

Mask-related skin eruptions are not uncommon and are especially associated with prolonged wearing of masks. Patients and the general population should be educated regarding the general measures required to minimize these side effects.

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